



Chapter 1

Indonesia's Energy Transition: A Challenge

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A. A Turning Point to Net Zero Emissions

The world is standing at a pivotal juncture in its quest for a sustainable future. The global consensus on the need to address climate change and reduce greenhouse gas emissions has set in motion an energy transition of unprecedented scale and significance. At the heart of this transformation lies the realization that our reliance on fossil fuels must diminish, and we must embrace cleaner, more sustainable energy sources (Anderson, 2020; Kamran & Fazal, 2021). In the context of Indonesia, a sprawling archipelagic nation endowed with abundant natural resources and a rapidly growing population, the energy transition presents both a formidable challenge and an immense opportunity. The urgency to curb emissions, coupled with

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the imperative to meet the energy demands of a burgeoning populace, calls for a meticulous and multifaceted approach (Brown et al., 2019; Wolgamot et al., 2012).

This book presents the approaches encapsulated in the *Energy Transition Preparedness Framework Towards 2045*, a comprehensive roadmap for navigating the complex terrain of Indonesia's energy future. Our journey through the roadmap has taken us on a captivating exploration of diverse themes, each shedding light on crucial aspects of the nation's transition towards a sustainable energy landscape. From examining the role of sub-national green leadership to dissecting the intricacies of environmental assessments for energy transition technologies, we have delved deep into the heart of Indonesia's energy transformation.

This chapter, a prologue to the whole book, serves as a comprehensive culmination of our odyssey through these themes. Within the pages, we will visit the critical discussions and analyses that have punctuated our exploration. Furthermore, we will extrapolate from these discussions, seeking to chart a course forward, examining the readiness and potential pitfalls on Indonesia's path toward a cleaner, greener energy future. As we embark on this intellectual journey, we invite you to join us in this examination of Indonesia's energy transition preparedness.

Before the journey starts, there are several important questions that must be answered. What potential and opportunities does Indonesia have to face this energy transition period? Are we truly ready for the challenges and opportunities that lie ahead? Can we harness the collective power of collaboration, innovation, and sustainable leadership to drive this transformation? The answers to these questions are vital, not only for Indonesia but for the global community as we collectively strive to mitigate the effects of climate change and secure a prosperous future for generations to come.

Thus, let us turn the page and dive into a comprehensive exploration of the *Energy Transition Preparedness Framework Towards 2045*, its implications, and the promise it holds for Indonesia and the world.

B. POTENTIAL ENERGY IN THE FUTURE

Due to its geographical position, Indonesia has various energy potentials. As an equatorial country, Indonesia receives abundant amounts of sun radiation throughout the year, making it the perfect place for harnessing solar power. As an archipelagic state, Indonesia boasts a plentiful of wind energy from the difference of characteristics between its land and sea. Ultimately, as a maritime nation, Indonesia has vast oceans teeming with natural resources. Most notably in terms of energy, the oceans store fossil fuels in the forms of oil and gas. However, these resources will not last forever, unlike solar and wind power. Therefore, there is a need to explore alternative way of utilizing Indonesia's open and enormous oceans as a potential renewable energy.

Ocean Thermal Energy Conversion (OTEC) has emerged as a promising frontier in the pursuit of sustainable and renewable energy that take advantage the ocean's temperature to produce energy. We need to explore the noteworthy progress witnessed in OTEC technology, with a specific focus on its technological readiness and ongoing efforts in system optimization.

Recent advancements in OTEC technology have propelled it closer to mainstream viability. Required technological readiness include these following points:

- 1) **Efficiency Enhancements.** Substantial efforts have been directed toward enhancing the efficiency of OTEC systems. What innovations exist in heat exchanger design? How have the exploration of high-performance working fluids played a crucial role in improving the overall conversion of thermal energy into electricity?
- 2) **Materials Innovation.** The challenging marine environment necessitates materials that can withstand corrosion. In this regard, we need innovations in materials science that led to the development of robust and corrosion-resistant materials, contributing to the longevity and economic viability of OTEC systems.

- 3) **Pilot Projects.** There is a need for small-scale OTEC facilities and pilot projects that serve as invaluable testing grounds. These initiatives are expected to provide real-world data, operational insights, and essential validation of OTEC's feasibility, and the process of moving the technology from theoretical concepts to practical applications.
- 4) **System Optimization.** System optimization is a critical avenue for maximizing the efficiency and impact of OTEC. Ongoing efforts required in this domain encompass the following points:
 - a) **Heat Exchanger Refinement.** System optimization involves continuous refinement of heat exchangers to enhance heat transfer efficiency. Improving this key component contributes directly to the overall efficiency of OTEC systems.
 - b) **Environmental Considerations.** As OTEC projects progress, there has to be an improvement emphasizing on mitigating potential environmental impacts. Addressing concerns such as the discharge of nutrient-rich deep ocean water must be an integral part of the ecological sustainability of OTEC systems.
 - c) **Integration with Other Energy Sources.** To bolster the reliability of OTEC systems, integration with other renewable energy sources needs to be explored. This includes examining synergies with solar and wind energy to create hybrid systems that can provide consistent power regardless of variations in weather conditions.
 - d) **Scale-Up Strategies.** System optimization also needs to involve strategies for scaling up OTEC systems to utility-scale applications. This includes considerations for offshore installations, grid integration, and economic viability at larger scales.
 - e) **Economic Viability.** The economic feasibility of OTEC is a crucial aspect of system optimization. Innovative financing models, cost-reduction strategies, and exploration of market

incentives are being actively pursued to make OTEC more competitive within the broader energy landscape.

As OTEC technology advances and system optimization efforts progress, it stands on the brink of transforming from a theoretical concept to a commercially viable and impactful source of renewable energy. The inexhaustible potential of ocean thermal energy positions OTEC as a significant player in the global pursuit of sustainable and clean energy solutions.

In addition to technical requirements, OTEC faces challenges, including high upfront costs and limited geographic applicability. Overcoming these challenges requires ongoing collaborative efforts between researchers, industry stakeholders, and policymakers. Looking ahead, continued refinements in OTEC technology, coupled with supportive policies and investments, could position it as a pivotal contributor to the global energy mix. Technological readiness and system optimization underscore OTEC's potential as a transformative force in the transition towards a sustainable and diversified energy future.

C. INDONESIA'S ENERGY TRANSITION READINESS: AN IN-DEPTH ANALYSIS

As Indonesia stands at the crossroads of a monumental energy transition, a critical question reverberates through policy chambers and public discourse alike: are we genuinely prepared for the challenges and opportunities this transition presents? This question arises considering the complexity of the existing problems. As stated by President Joko Widodo at the S20 High Level Policy Webinar on Just Energy Transition, energy transition is not just about switching the utilization and use of fossil fuels to renewable energy. More than that, the energy transition also involves a number of very complex aspects from science and technology to socioeconomics and the environment (Primadhyta, 2022). To answer that question, an incisive analysis of readiness is needed across several major aspects provides a nuanced

understanding of Indonesia's position on the precipice of this transformative journey. The readiness analysis includes:

1) Infrastructure Readiness

The backbone of any energy transition is infrastructure. In Indonesia's case, there are both commendable strides and lingering gaps. Urban areas often showcase a more robust energy infrastructure, especially in the context of renewable energy projects. However, rural and remote areas face challenges in accessing reliable energy sources. A comprehensive analysis should delve into the existing infrastructure, identifying bottlenecks and outlining strategies for equitable development.

2) Policy Landscape

The policy environment sets the tone for the success of an energy transition. Indonesia has made significant strides in formulating policies that promote renewable energy adoption and sustainability. However, the efficacy of these policies hinges on implementation. An in-depth analysis should scrutinize policy frameworks, exploring their coherence, enforcement mechanisms, and adaptability to evolving technological landscapes.

3) Public Awareness and Engagement

The success of an energy transition is intricately linked to public awareness and engagement. While awareness of environmental issues is increasing, there remains a gap in understanding the nuances of energy transition technologies. A comprehensive analysis should assess the effectiveness of public awareness campaigns, educational programs, and the overall level of public engagement.

4) Technological Innovation and Research Development

Indonesia's energy transition necessitates cutting-edge technological solutions. A critical analysis of the readiness in technological innovation and research development should explore ongoing initiatives, collaborations between research institutions and industry, and the nation's capacity to harness emerging technologies. This includes

advancements in renewable energy, energy storage, and smart grid technologies.

5) Investment and Financial Preparedness

The scale of the energy transition demands substantial financial investment. A comprehensive analysis should evaluate Indonesia's financial preparedness, exploring the availability of funding mechanisms, incentives for private investment, and the nation's ability to attract international capital. A clear understanding of financial readiness is pivotal for the sustained momentum of the energy transition.

6) Environmental and Social Impact Mitigation

As energy transition projects unfold, mitigating environmental and social impacts becomes paramount. An analysis should scrutinize the frameworks in place for impact assessment, community engagement, and the mechanisms for addressing adverse effects. This includes evaluating the effectiveness of regulatory bodies in ensuring that projects adhere to environmental and social standards.

In the case of Indonesia, the analysis reveals a nation on the brink of transformation. While strides may have been made, challenges persist. The intricate interplay of infrastructure, policies, public awareness, technology, finance, and impact mitigation necessitates a holistic approach. We recognize that these challenges provides an opportunity for strategic interventions to fortify areas of weakness and amplify strengths. The readiness for an energy transition is not a static state; it is a dynamic equilibrium that requires continuous refinement and adaptation. Indonesia's case serves as a microcosm of the global challenge. Through a meticulous analysis of these major aspects, the nation can chart a course that aligns economic development with environmental sustainability, ensuring that the energy transition becomes a catalyst for a prosperous and resilient future.

D. COLLABORATION: CORNERSTONE OF SUCCESS

In the pursuit of a sustainable energy transition, collaboration stands as one of the cornerstones needed to achieve success. The complex nature of energy systems requires the collective effort of diverse stakeholders, ranging from government bodies and private enterprises to local communities. An equitable and sustainable energy transition demands a comprehensive action plan built on collaboration, ensuring that the benefits of this transition are shared by all. Central to this collaborative action plan is the need for a multi-stakeholder approach. Government bodies, at both national and sub-national levels, must work in tandem with private sector entities, non-governmental organizations, and local communities. A robust regulatory framework that encourages collaboration and establishes clear roles and responsibilities is essential. This framework should incentivize innovation, investment, and adherence to sustainable practices.

Equity in the energy transition is not solely about equal distribution of benefits, but also about inclusivity in decision-making processes. Communities impacted by energy projects should have a seat at the table, contributing to the design and implementation of initiatives. This participatory approach is needed to ensure that the transition is sensitive to local needs and concerns, fostering a sense of ownership and responsibility. Furthermore, a collaborative action plan should prioritize knowledge exchange and capacity building. This is particularly pertinent in the context of Indonesia, where the diversity of regions requires tailored solutions. Initiatives that facilitate the sharing of technological know-how, best practices, and lessons learned can bridge the gap between regions at different stages of the transition journey (Lu, et al., 2020; Chen, in press).

Case studies from collaborative initiatives in Indonesia, such as public-private partnerships in renewable energy projects, illustrate the potential impact of a united front. By pooling resources, expertise, and finances, these collaborations have accelerated the deployment of renewable energy infrastructure. This not only contributes to environmental sustainability but also stimulates economic growth

and job creation. However, challenges persist, including the need for transparent communication and conflict resolution mechanisms.

A collaborative action plan must anticipate and address potential conflicts of interest, ensuring that the transition process remains inclusive and avoids exacerbating existing disparities. Basically, a collaborative action plan for an equitable and sustainable energy transition is not a mere aspiration but a pragmatic necessity. It requires a holistic approach that engages all stakeholders, fosters inclusivity, and prioritizes knowledge-sharing. As we navigate the complexities of Indonesia's energy landscape, the success of collaborative initiatives underscores the transformative power of collective action. In the coming years, the strength of these collaborations will determine the pace and inclusivity of Indonesia's journey towards a more sustainable energy future.

E. CLEAN COMPANY FOR BETTER COLABORATION

One of the elements needed in a collaborative grid toward net-zero emission is clean power companies. This is not an easy step. Becoming a clean power company is a transformative journey that hinges on a holistic commitment to sustainability and environmental responsibility. The path to achieving this goal involves a series of strategic steps and considerations, all aimed at reducing environmental impact and promoting clean energy practices. Several aspects needed to create a clean power company include:

- 1) **Commitment to Sustainability.** At the heart of every clean power company is an unwavering commitment to sustainability. This commitment should be reflected in the company's core values, mission, and business strategies. It serves as the guiding principle that underpins all efforts toward a cleaner energy future.
- 2) **Transition to Renewable Energy Sources.** A pivotal step in becoming a clean power company is the adoption of renewable energy sources. This includes investing in solar, wind, hydro, and other clean technologies for energy generation. Companies

should set ambitious targets for transitioning to renewable energy and work diligently to achieve them.

- 3) **Energy Efficiency and Conservation.** Prioritizing energy efficiency and conservation is essential. Companies must take steps to minimize energy waste, employ energy-efficient technologies in their operations, and promote energy-saving practices both internally and among customers.
- 4) **Grid Modernization and Smart Technologies.** Grid modernization and the integration of smart technologies are key elements of a clean power strategy. These initiatives enhance grid reliability, facilitate the integration of renewable energy sources, and enable real-time monitoring and demand response.
- 5) **Carbon Emissions Reduction.** Addressing carbon emissions is a central goal. This includes reducing emissions associated with energy generation as well as those stemming from the entire value chain, including manufacturing, transportation, and supply chain operations.
- 6) **Collaborations and Partnerships.** Collaboration with other clean energy stakeholders is crucial. Partnerships with government agencies, research institutions, and industry peers can foster innovation, knowledge sharing, and the identification of financing opportunities for clean energy projects.
- 7) **Regulatory Compliance and Policy Advocacy.** Clean power companies must adhere to environmental regulations and advocate for supportive policies that accelerate the clean energy transition. Engaging with policymakers and industry associations is a strategic approach to shaping favorable regulatory environments.
- 8) **Customer Engagement and Education.** Engaging and educating customers about clean energy options is essential. Companies should communicate the benefits of renewable energy, offer green energy products, and provide tools and resources to help customers reduce their energy consumption.

- 9) **Transparency and Reporting.** Maintaining transparency is critical for building trust and accountability. Clean power companies should regularly report on their environmental performance, including emissions reductions, renewable energy capacity, and sustainability initiatives.
- 10) **Continuous Improvement and Innovation.** The journey to becoming a clean power company is an ongoing process. Companies should foster a culture of continuous improvement and innovation to stay at the forefront of clean energy technologies and practices.

Thus, the transformation into a clean power company requires a holistic commitment to sustainability, clean energy adoption, and environmental responsibility. By embracing these principles, companies can reduce their environmental impact, lead by example, and contribute to a cleaner and more sustainable energy future.

F. BATTERYLESS ROOFTOP SOLAR HOME SYSTEM FOR URBAN AREA

In the hustle and bustle of Indonesia's urban landscapes, a quiet revolution is taking place atop countless rooftops—the advent of the batteryless rooftop solar home system (RSHS). This gives hope for the strengthening of energy transition in Indonesia. In a departure from traditional solar setups, this innovation sidesteps the need for energy storage, redefining how urban households harness and utilize solar energy. One of its remarkable features is cost efficiency. By forgoing the expense of batteries, the overall cost of the system takes a dip, bringing the benefits of solar power within financial reach for urban dwellers. This affordability is instrumental in encouraging community participation and collaboration between parties in the widely adopting of renewable energy in urban settings.

The expected advantages of this system include:

- 1) **Efficient Solar Energy Utilization.** This groundbreaking system directly taps into the power of the sun. Solar panels, neatly

installed on rooftops, capture sunlight and seamlessly convert it into electricity. This electricity is immediately employed to meet the energy needs of households, doing away with the necessity for energy storage solutions like batteries.

- 2) **Reliability and Grid Independence.** The batteryless RSHS operates in tandem with the grid when the sun graces the sky. This means that households can seamlessly transition between solar power and the grid, ensuring a constant and reliable energy supply. It is a step towards reducing dependence on the grid, especially in areas prone to frequent power outages.
- 3) **Reduced Environmental Footprint.** By eschewing the need for energy storage batteries, this system makes a subtle yet impactful contribution to reducing the environmental footprint of solar energy adoption. The lifecycle impacts of battery manufacturing and disposal are bypassed, aligning with Indonesia's commitment to a more sustainable and eco-friendly energy landscape.
- 4) **Scalability and Integration.** Flexibility is a hallmark of the batteryless RSHS. It is a scalable solution, allowing households to expand their solar capacity based on evolving energy needs. Moreover, its adaptability allows for seamless integration with other renewable energy sources and energy-efficient technologies.

However, challenges persist. The intermittent nature of sunlight and nighttime energy requirements necessitate thoughtful considerations. Solutions lie in the integration of smart grid technologies and energy management systems. Additionally, urban policies and regulations need fine-tuning to accommodate and incentivize the widespread adoption of this innovative energy paradigm.

The silent revolution happening on urban rooftops is expected to rewrite the narrative of solar energy adoption. The batteryless rooftop solar home system represents a leap towards a more sustainable and grid-independent urban energy landscape. As this technology matures and regulatory frameworks catch up, it has the potential to be a cornerstone in Indonesia's journey toward a cleaner, greener, and more energy-efficient urban future.

G. ENVIRONMENTAL ASSESSMENT FOR ENERGY TRANSITION TECHNOLOGY

As Indonesia embarks on its journey towards a sustainable energy transition, cleaner, greener, and more energy-efficient, environmental assessment (EA) emerges as a critical tool to guide decision-making and ensure that the transition aligns with ecological sustainability. Five pivotal aspects related to EA for energy transition technologies in Indonesia warrant in-depth consideration are as follows.

- 1) **Environmental Impact Assessment (EIA).** A cornerstone of EA, EIA examines the potential environmental consequences of energy transition technologies. In the Indonesian context, this involves evaluating the impact on ecosystems, air quality, and water resources. Robust EIAs are essential to identify and mitigate adverse effects while preserving valuable natural assets. Indonesia's rich biodiversity and diverse landscapes necessitate comprehensive EIAs. Specific attention must be given to ecosystems vulnerable to disruption, such as rainforests and coastal regions. It is crucial that EIAs adhere to international best practices and are conducted by independent experts to ensure objectivity (Burke & Stephens, 2018).
- 2) **Social and Cultural Impact Assessment.** Energy transition technologies often intersect with local communities and cultural heritage. Assessing the social and cultural impacts is essential to mitigate potential conflicts and ensure equitable development. For Indonesia, this includes evaluating how projects may affect indigenous communities and traditional practices. An inclusive approach to social and cultural impact assessment involves meaningful engagement with affected communities, respecting their rights and traditions (Mulia, et al., 2023; Escobar et al., 2021). Transparent and participatory processes can foster mutual understanding and collaborative solutions.
- 3) **Health Impact Assessment.** The health of the population must not be overlooked. The deployment of energy transition technologies should prioritize public health by assessing potential

health risks associated with emissions, pollutants, or disruptions caused by these technologies. In Indonesia's urban areas, where air quality can be a concern, health impact assessments should address issues like respiratory health and quality of life. Robust health impact assessments can guide mitigation measures and prioritize the well-being of communities.

- 4) **Regulatory Compliance and Permitting.** Navigating Indonesia's regulatory landscape is complex, and energy transition projects must adhere to stringent environmental regulations. Ensuring compliance with these regulations and obtaining the necessary permits is a fundamental aspect of EA. Streamlining permitting processes, enhancing regulatory clarity, and providing clear guidance for compliance can facilitate the efficient deployment of energy transition technologies. Timely approval is essential to minimize delays and costs.
- 5) **Long-term Sustainability and Monitoring.** The effectiveness of EA does not end with project approval. Continuous monitoring and evaluation are vital to assess the ongoing impact of energy transition technologies and ensure that they remain aligned with sustainability goals. Developing a robust framework for post-project monitoring and environmental management is imperative (Resosudarmo et al., 2023). This includes mechanisms for adaptive management, addressing unforeseen issues, and ensuring that projects evolve to meet changing environmental standards and expectations.

Environmental assessment is an indispensable component of Indonesia's energy transition journey. Key aspects discussed here underscore the need for a holistic, multidisciplinary approach that considers ecological, social, cultural, and health-related impacts. By prioritizing rigorous assessments, Indonesia can steer its energy transition towards a sustainable future, where clean energy technologies coexist harmoniously with the environment and society.

H. GREEN LEADERSHIP: ANOTHER PILLAR OF THE ENERGY TRANSITION

The global imperative for sustainable development has placed sub-national entities at the forefront of transformative change. Within the context of Indonesia's energy transition, the role of sub-national leadership becomes pivotal. Green leadership, characterized by a commitment to sustainable practices and innovation, emerges as a driving force at the regional level. Sub-national entities, including provinces and municipalities, wield significant influence over energy policies and local development initiatives. Green leadership at this level is not merely a theoretical concept but a tangible force capable of shaping the trajectory of the nation's energy landscape. Several regions within Indonesia have exemplified this transformative potential, leveraging local resources and governance structures to champion sustainable practices.

Central to the concept of green leadership is the integration of environmental considerations into policy formulation. Sub-national leaders play a crucial role in crafting policies that balance economic growth with ecological sustainability (PwC, 2021). By prioritizing renewable energy sources and incorporating eco-friendly practices into urban planning, these leaders set the stage for a resilient and sustainable energy future. Furthermore, the role of sub-national entities in promoting renewable energy projects should not be understated. Green leaders leverage their local knowledge to identify and exploit renewable energy potential unique to their regions. Whether it be harnessing solar energy in sun-drenched provinces or tapping into geothermal reservoirs near volcanic regions, these initiatives are tailored to the specific characteristics of each locale. Case studies from regions like East Java and Bali offer compelling narratives of successful green leadership. In East Java, local authorities have championed geothermal energy projects, tapping into the vast potential beneath the earth's surface. Bali, on the other hand, has become a beacon of sustainable tourism, showcasing the symbiotic relationship between environmental conservation and economic growth.

Yet, challenges persist. While some regions have embraced green leadership, others grapple with infrastructural limitations and resource constraints. The need for capacity building and knowledge transfer becomes apparent. Initiatives that facilitate the exchange of best practices and provide technical support can catalyze green leadership in regions facing hurdles. In conclusion, the transition at the sub-national level through green leadership emerges as a linchpin in Indonesia's journey towards a sustainable energy future. It is not merely a theoretical construct but a dynamic force shaping policies, driving innovation, and inspiring communities. As we reflect on the strides made by provinces and municipalities, it becomes evident that fostering green leadership is not only imperative but achievable. The success stories and lessons learned at the sub-national level serve as a beacon, guiding Indonesia toward a future where sustainability and progress coalesce.

I. EMBARK ON AN ENERGY TRANSITION JOURNEY

Indonesia's Energy Transition Preparedness Framework Towards 2045 represents a comprehensive blueprint for navigating the complex and transformative journey towards a more sustainable and clean energy future. This framework encompasses a multitude of critical aspects, each contributing to Indonesia's readiness and success in its energy transition efforts.

To strengthen Indonesia's preparations for this energy transition, a collaborative action plan is needed, supported by clean and environmentally friendly companies, and a better urban energy system. In addition, an environmental assessment system is needed that is supported by green leadership. Collaboration among stakeholders, from government bodies to local communities, is pivotal in achieving equitable and sustainable energy transition outcomes. The framework underscores the importance of multi-stakeholder engagement, transparency, and knowledge exchange.

We start by identifying the status of progress in energy technology. Progress on technological readiness and system optimization: **OTEC**

technology is making significant strides in technological readiness and system optimization. It represents a promising avenue for sustainable energy generation, with ongoing advancements positioning it as a transformative force in Indonesia's energy landscape. However, technological innovation will not provide any progress if there are no other pillars needed to build energy transition readiness. Indonesia's readiness for the energy transition was analyzed, showcasing progress in key areas while acknowledging the need for ongoing efforts to address challenges and enhance preparedness.

That is why, **clean power companies** are at the forefront of the energy transition. They prioritize sustainability, renewable energy adoption, and continuous improvement. This theme underscores the importance of commitment to clean energy, innovation, and transparency in becoming a leader in the clean power sector. Furthermore, as Indonesia's urban areas face energy challenges, the innovative **batteryless rooftop solar home system** offers an affordable, reliable, and environmentally friendly solution. Its adoption can revolutionize urban energy landscapes and contribute to a cleaner future. However, robust **environmental assessment** processes are essential to mitigate the environmental and social impacts of energy transition technologies effectively. The framework highlights five crucial aspects related to EA, ensuring that sustainability remains at the forefront of Indonesia's energy transition. Ultimately, the transition to sustainable energy at the sub-national level requires visionary **green leadership**. This theme recognizes the importance of local leadership and community engagement in Indonesia's diverse landscape.

Therefore, our journey within the *Indonesia's Energy Transition Preparedness Framework Towards 2045* offers a comprehensive roadmap for Indonesia's journey towards a cleaner and more sustainable energy future. Each theme underscores critical aspects that, when combined, create a holistic approach to navigate the complex terrain of the energy transition. By embracing these principles, Indonesia can lead by example, setting the stage for a brighter and more sustainable energy landscape for generations to come.

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